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MEMORANDUM

TO: Michael Berkoff REF. NO.: 56393

FROM: Greg Carli DATE: April 23, 2009

C.C.: Paul Bucholtz (MDEQ)
Jeff Keizer (CH2MHill)
Todd King (CDM)
Richard Gay (Weyerhaeuser)
Marv Lewallen (Weyerhaeuser)

RE: Completion of Remedial Design
12th Street Landfill, Operable Unit No. 4
Allied Paper, Inc./Portage Creek/Kalamazoo River Superfund Site
Allegan and Kalamazoo Counties, Michigan

1.0 INTRODUCTION

This memorandum has been prepared as a follow up to the conference call conducted on April 17, 2009 between representatives of the United States Environmental Protection Agency (U.S. EPA), Michigan Department of Environmental Quality (MDEQ), and Weyerhaeuser Company (Weyerhaeuser) to outline a plan for completion of the Remedial Design (RD) for the 12th Street Landfill Site (Site). During the conference call it was established that completion of the Remedial Action (RA) for the Site was not possible in the 2009 construction season and that construction of the landfill cap if started in 2009 would need to be completed in 2010. Rather than completing the entire construction in 2010, as originally presented in Weyerhaeuser's April 9, 2009 letter to U.S. EPA, Weyerhaeuser proposed an approach during the conference call that would result in a completion of a significant portion of the RA work in 2009, with the remainder of the work in 2010, which would minimize the risk to the environment. As part of this approach, U.S. EPA, MDEQ and Weyerhaeuser would work together to incorporate a number of design changes into the RD which would help to offset the costs of completing the construction in two seasons.

The remainder of this memorandum will outline the approach for completing the RD, provide additional details on the proposed design changes, and provide a schedule for completion of these activities. It should be noted that Conestoga-Rovers & Associates (CRA) is continuing to work on the construction sequencing and scheduling and will provide additional details on the RA implementation at a later date.

The following sections provide a summary of CRA's comments and the Pre-final Design, CRA's proposed design changes, and a proposed approach for completing the RD phase of this project.

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ENGINEERING DESIGN

2.0 CRA's COMMENTS ON THE PRE-FINAL DESIGN

CRA has reviewed the Pre-Final Design Report, 12th Street Landfill Site, Otsego Township, Michigan prepared by RMT, Inc. and dated January 2009 (Pre-Final Design) and the associated design drawings, specifications, and supporting calculations, and the March 6, 2009 responses to the U.S. EPA's and MDEQ's Initial Verbal Comments on the Pre-Final Design, with respect to the following to primary objectives:

1. Identify comments on the Pre-Final Design which add clarification to the report and/or design which will assist with accurate interpretation of the design during the RA; and
2. Identify potential design modifications which will optimize the design, both during the construction phase and during the operation and maintenance (O&M) phase.

CRA prepared a detailed summary of comments on each component of the Pre-Final Design Report organized by design document (e.g. Design Report, Design Drawings, Specifications, etc.) that went section by section through each document as applicable. These ranged from minor comments on the document (e.g., consistency or clarification comments) to more major comments which relate to the fundamental approach of the design which may have a significant impact on the RA. CRA has discussed the minor comments with Weyerhaeuser and/or RMT and feels that no further action on these comments is necessary. Therefore, CRA's has summarized the most significant comments on the Pre-Design Report and presented them below.

Comment No. 1: Landfill Gas Venting System

CRA has several comments on the landfill gas venting system as it is designed in the Pre-Final Design submittal. The comments are summarized below.

- The design includes a provision for an active gas collection system should it be needed at a future date. Further consideration should be given to eliminating the active gas collection system from the design;
- If it is decided that the active gas collection system is necessary, there are several changes to the design of this system which should be considered to improve the constructability and performance of the system such as the use of additional geotextile in the venting layer to reduce/eliminate the amount of bedding material required and reconsideration of the placement of the gas collection pipe to reduce the amount of piping necessary; and
- The number of gas vents for the passive gas venting system is approximately three vents/acre and could be reduced to a more typical one vent/acre by optimizing the placement of the vents.

As discussed in the April 9, 2009 letter to U.S. EPA, Weyerhaeuser intends to conduct additional field investigations to collect data on the landfill gas generation rates so that a better estimate of the landfill gas production can be determined, and an appropriate landfill gas management system can be designed and included in the RA to address this comment.

Comment No. 2: Groundwater Management During Construction

The Pre-Final Design Report does address the issue of groundwater management if it is encountered during the excavation activities, however, there is limited information on how the water will be managed on-site and who will be responsible for determining the appropriate method of groundwater management (i.e., on-site discharge or off-site disposal). Similar comments were also raised by U.S. EPA/MDEQ in their verbal

comments on the Pre-Final Design. Additional detail may be appropriate related to items such as treatment capacity, batch treatment, filter size, residence time for carbon, etc. Water volumes will likely be sufficient to eliminate trucking as a viable option.

Comment No. 3: Flood Protection Along Kalamazoo River

The design includes 30 feet of additional clay placement and 50 feet of additional rip rap placement in the northeast corner of the landfill adjacent to the Kalamazoo River. This would be a small extension of the previously placed buffer zone constructed at the base of the eastern side slope to provide flood protection when the river rises to a 500 year flood level. It is unclear whether or not the design considered cutting back the landfill slopes in the northeast corner to eliminate the need for extending this flood protection work. This would avoid any difficulty in making the connection between the previous constructed clay barrier layer and the rip rap embankment.

Comment No. 4: Storm Water Management

The final cover system in the Pre-Final Design essentially includes the mid-slope bench (nature walk) and the access road at the toe of the slope as quasi-drainage ditches. The nature walk includes a perforated underdrain system to collect surface water and discharge the collected water through downslope flumes. The access road is tipped back toward the landfill at a 10:1 slope forming a small trough at the base of the slope, but this appears to end where the edge of the landfill curves to the east. Assumedly, the collected surface water would then discharge to the wetland area, but there does not appear to be any erosion control structure at this location (unless it's combined with the outlet structure for the west side downslope flume).

However, neither the nature walk nor the access road are sized such that they would contain any significant rain event resulting in surface water becoming sheet flow down the slopes of the landfill in larger rain events. Since these larger rain events would be of greater concern with regards to soil erosion, it is unclear the value in collecting smaller flows in the underdrain system. The difficulty in constructing and maintaining the perforated pipes under the nature walk does not seem to warrant the additional effort. Also, the tipped back access road may result in erosion of the toe of the cover system and the inside edge of the road which will require additional O&M efforts/costs. If the storm water collection system remains as part of the design, the design should be reviewed to improve the constructability of the system and to optimize the system to ensure the minimal O&M activities.

Comment No. 5: Perimeter Access Road

The design includes a perimeter access road along the west, north, and east sides of the landfill. The road is specified to be constructed of general fill and select aggregate fill. However, along the Kalamazoo River, the access road is being constructed of topsoil and turf reinforcement mat. It is unclear the need for a gravel access road around the perimeter of the landfill, particularly when the section along the Kalamazoo River will be topsoil based. It is unclear if the possibility of making a grass access road around the entire site and restricting access to all-terrain vehicles (ATVs) was considered during the design. The sole purpose of this road is for access to the groundwater monitoring wells, so access to typical road vehicles should not be necessary.

Another consideration would be that the access road at the south end, adjacent to 12th Street, is actually shown to have slopes of 4:1 and 6:1 on the west and east sides, respectively. This may become difficult for vehicles to climb, particularly in wet weather, and could also result in significant erosion of the granular

surface as surface water flows along this road, which is also acting as a quasi-drainage ditch. Also, restricting access to ATVs would prevent unauthorized vehicular access and could result in the road being less than 10 feet in width. The reduction in the width of the road would reduce the volume of cut material to be removed from the existing side slopes reducing.

Finally, unless there is a specific need for a complete circumferential access road, the portion of road along the north side of the adjacent Michigan Department of Natural Resources (MDNR) property could be removed from the design. Access to the southeast corner of the landfill would be available via the previously constructed bench along the Kalamazoo River, while there would still be a constructed access road along the west side of the MDNR property (ending at the northwest corner). This would eliminate the tight bend around the corner of the MDNR property and reduce the amount of cut into the existing slope required along the southern property boundary.

Comment No. 6: Extent of Paper Residual Excavation

Further clarification on the method for determining the proposed final limit of paper residuals is necessary. There are some locations around the landfill site which do not seem to follow the typical pattern/distance inside the current property limits. For example, in the southwest corner, the proposed limit of paper residuals moves further into the landfill while the current location of the side slope actually extends further beyond the property boundary. Around the north side, the limit of paper residuals extends almost 20 feet beyond the current toe of slope, which would result in additional final cover system being constructed.

3.0 PROPOSED DESIGN CHANGES TO OPTIMIZE REMEDY

CRA has reviewed four significant design modifications to determine if a benefit to the RA exists and conducted a preliminary assessment of the potential benefit. The four design modifications reviewed include:

- Reducing the side slope of the landfill from 4:1 to 3:1;
- Removing 1 foot of material from the capping system above the liner;
- Removing the gas venting layer from the capping system; and
- Reducing the frequency of gas vents.

The following subsections provide details of CRA's review of the above design modifications.

3.1 REDUCING SIDE SLOPE FROM 4:1 TO 3:1

The Pre-Final Design identifies an typical side slope for the landfill of 4:1, with the exception of the east slope towards the Kalamazoo River which has already been cut back to 5:1. In order to achieve this side slope approximately 26,600 cubic yards of material will need to be cut from the sides and relocated to the top of the landfill. In addition, 12,200 cubic yards of paper sludge residuals will need to be relocated from outside of the limit of the landfill and placed within the landfill foot print, requiring a total of 38,800 cubic yards of material to be relocated. The current design has a capacity of 45,800 cubic yards of material that could be placed under the cap. Therefore, there is a surplus of approximately 7,000 cubic yards of capacity within the existing design (this would need to be made up from an off-site source, or could be used up in additional off-site excavation of paper sludge residuals as a result of confirmatory sampling).

CRA proposes to redesign the slope of the landfill to an typical slope of 3:1, with the exception of the current 5:1 slope on the east side along the Kalamazoo River. The result of the change in slope will have the following affect on the RA:

- Reduce the amount of material to be cut from the slopes to achieve grades to approximately 8,500 cubic yards (from 38,800 cubic yards);
- Reduce the total capacity of the material that could be placed under the cap to 25,000 cubic yards and reduce the height of the landfill to 736 feet above mean sea level (AMSL) from 740 feet AMSL in the current design; and
- The total capacity for off-site fill material under this scenario is approximately 4,000 cubic yards but could be as high as 12,000 cubic yards should capacity be needed.

Figure 1 shows the conceptual final contours of the cap assuming a 3:1 slope and a top slope elevation of 736 feet AMSL. Selected cross-sections of the cap are provided on Figure 2. It should be noted that the contours shown on Figure 1 are preliminary in nature to show the concept of the revised design with a 3:1 slope. The grades and related cut/fill volumes will need to be fine tuned during the design process.

3.2 REMOVING 1 FOOT OF MATERIAL FROM THE CAPPING SYSTEM

The Pre-Final Design includes the following cap construction above the liner system:

- 12 inches of select granular fill for drainage over the liner;
- 12 inches of general fill (root zone depth beneath the topsoil); and
- 6 inches of topsoil to support vegetative cover.

CRA proposes that both the select granular fill layer and the general fill layer could be reduced to 6 inches. Further design calculations would need to be conducted to confirm this is possible for the drainage layer. Alternatively a synthetic drainage layer with select granular fill may be a suitable option. With respect to the change in the general fill layer, this change could have a potential impact on O&M activities, however, provided that O&M activities are completed diligently the impact should be minimal (e.g. if a deep rooted species of vegetation were allowed to become established it could damage drainage layer, however, if proper maintenance is conducted this type of species would be removed before the root system has time to become established).

3.3 REMOVING THE GAS VENTING LAYER FROM THE CAPPING SYSTEM

The Pre-Final Design includes 6 inches of select granular fill beneath the liner to act as a gas venting layer. Based on the pre-design gas study completed by RMT, which found between 0.9 percent and 24.7 percent combustible gases present, the gas venting layer is unnecessary and could be removed or significant reduce (through the use of venting strips) to optimize the design.

3.4 REDUCING THE FREQUENCY OF GAS VENTS

The Pre-Final Design identified a total of 19 gas vents (approximately three gas vents/acre) placed throughout the landfill and connected to a achieve gas collection system that would be installed solely as a contingency should it be required. The frequency of gas vent is high relative to other projects CRA has been involved in and the gas venting system could be re-designed to include only gas vents along the peak of the landfill and without the active gas collection system connections. This would result in a total of seven gas vents (or approximately one gas vent/acre).

4.0 DESIGN COMPLETION APPROACH AND SCHEDULE

During the April 17, 2009 conference call, U.S. EPA indicated that they are satisfied with the Pre-Final Design submittal from RMT and are prepared to conditionally approve the documents as a final design. Therefore, to minimize the amount of work necessary to incorporate the comments and design modifications presented above, CRA proposes to prepare an addendum to the Pre-Final Design for review and approval by U.S. EPA and MDEQ. Section 6 - Design Components of the Pre-Final Design report is the section most affected by the comments and proposed design modifications. Therefore CRA will provide the following deliverables to U.S. EPA:

- A revised Section 6 of the Pre-Final Design Report addressing the comments and design modifications. CRA will provide the initial submittal as a redline/track changes document to facilitate agency review;
- A summary of changes to any other sections of the Pre-Final Design Report or response to comment document that are determined to be necessary;
- A new set of design engineering drawings will be prepared for the project by CRA;
- Revisions to the project specifications (Appendix E), as needed, to reflect the design modifications and new design drawings; and
- Revisions to the appendices, as needed. It is anticipated that the following appendices will be resubmitted or substantially revised for review and approval:
 - Appendix B - Slope Stability Calculations,
 - Appendix F - Erosion Protection Analysis, and
 - Appendix G - Surface Water Management Calculations.

It is anticipated that the following appendices will require minor revisions:

- Appendix C - Construction Quality Assurance Project Plan,
- Appendix D - Performance Standards Verification Plan,
- Appendix M - Multi-Area Quality Assurance Project Plan, and
- Appendix N - Multi-Area Field Sampling Plan.

It should be noted that the Appendix M and N will be revised in conjunction with Remedial Investigation work to be conducted at the Plainwell Mill Site. CRA has also prepared a revised Health and Safety Plan (HASP) for both projects pertaining to investigation and construction activities; and

- Revised RA Construction Schedule.

In order to complete the necessary design elements to the level that they are required, and to provide the agencies with information to demonstrate progress on the design and streamline review, CRA proposes to provide the information in three deliverables as follows:

1. Pre-Final Design Amendment Submittal 1 – to include the following:
 - Revised text of Section 6 of the Pre-Final Design Report and a summary of any other Pre-Final Design Report changes,
 - Design drawings at an approximately 60 percent completion stage,
 - Revisions to Appendices D, M and N,
 - Preliminary design calculations for surface water and erosion control,
 - Revised RA construction schedule;
2. Pre-Final Design Amendment Submittal 2 – to include all elements of the Stage 1 submittal, revised to address agency comments and updated information as well as the following:
 - Design drawings at 100 percent completion stage,
 - Revisions to Appendix C and Appendix E (approximately 90 percent),
 - Complete Appendix F and Appendix G, and
 - Preliminary design calculations for the geotechnical and landfill gas evaluations.
3. Pre-Final Design Amendment – Final Submittal – to include all required elements at a final level of detail.

The intent of this approach is to include sufficient information in the first submittal to allow U.S. EPA to provide conditional approval of the Pre-Final Design as amended thereby allowing Weyerhaeuser to begin the RA Work Plan in time that the RA Work Plan can be submitted and approved to start construction in July 2009. The subsequent submittals will be structured to address the conditions in the U.S. EPA approval and providing supporting information to support the design elements as needed (e.g., landfill gas calculations).

Figure 3 provides a project schedule for completion of the RD. Weyerhaeuser has instructed CRA to begin this effort immediately and the design kick off meeting to review the design modifications, deliverables, and schedule has been completed. A key element to completing this effort in the schedule provided will be regular communication between the various parties involved.

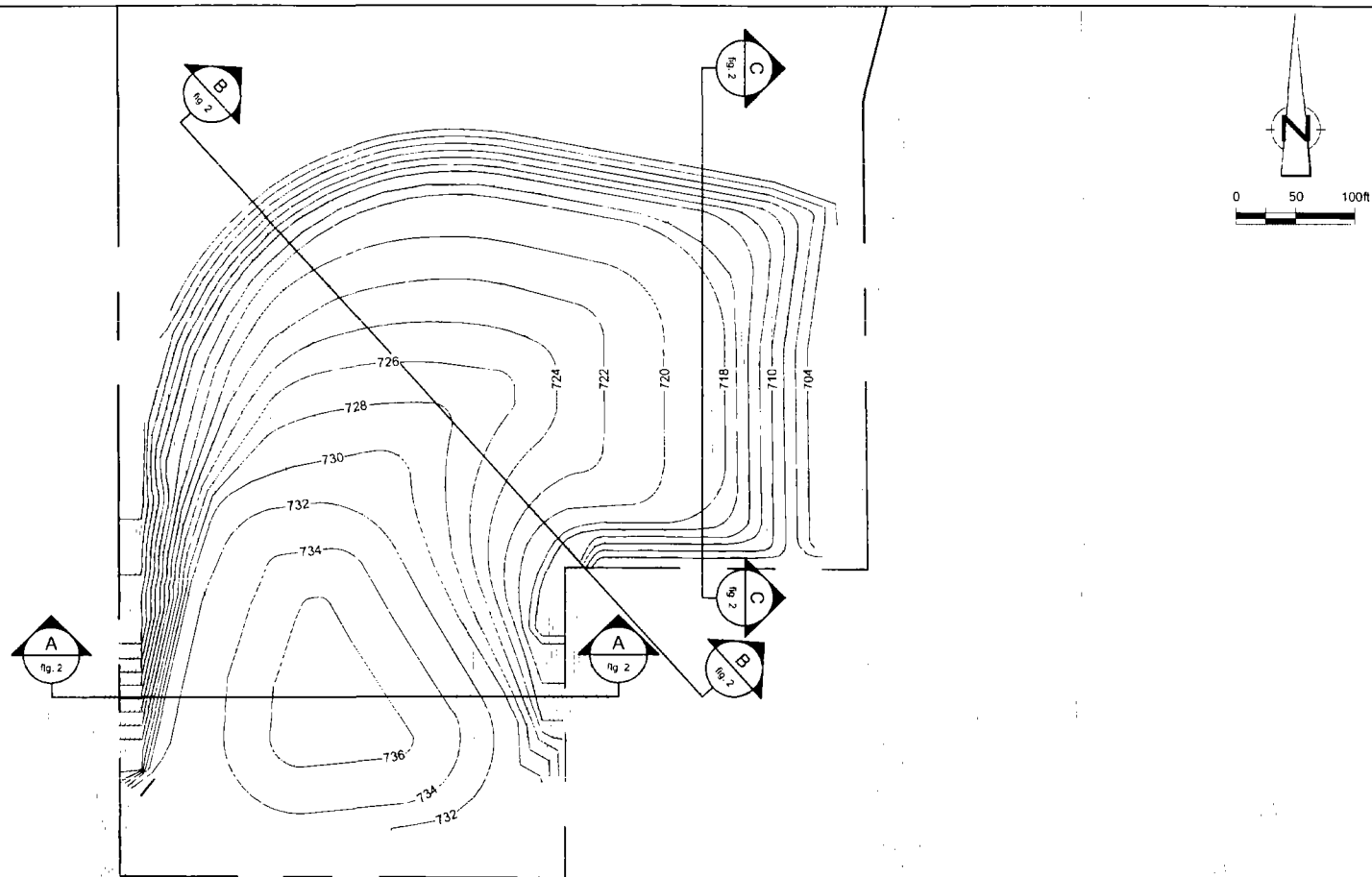
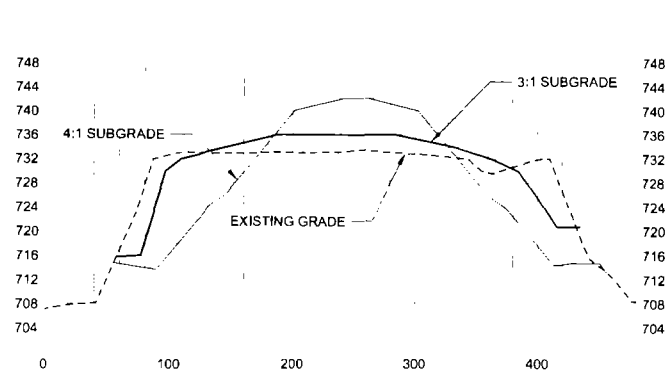
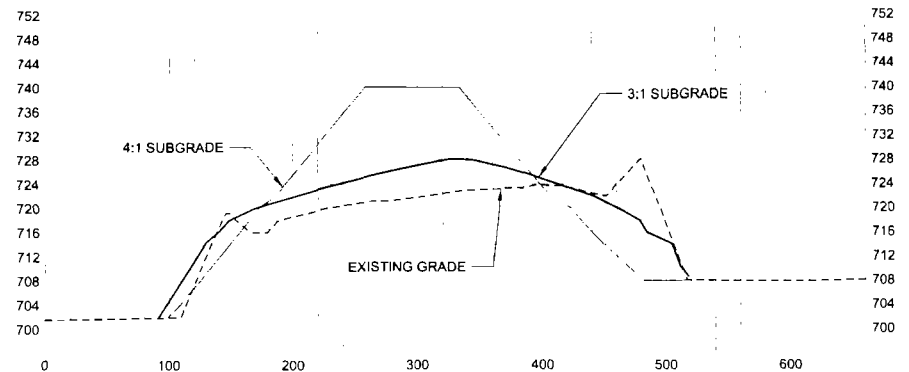


figure 1
 CONCEPTUAL REVISED GRADING PLAN
 3:1 GRADING ALTERNATIVE
 12th STREET LANDFILL
Otsego Township, Michigan

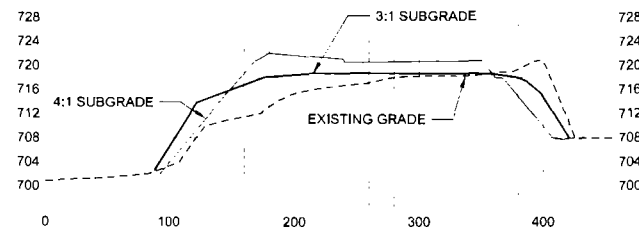




SECTION A
HORZ: 1"=100'
VERT: 1"=20'
fig. 1



SECTION B
HORZ: 1"=100'
VERT: 1"=20'
fig. 1

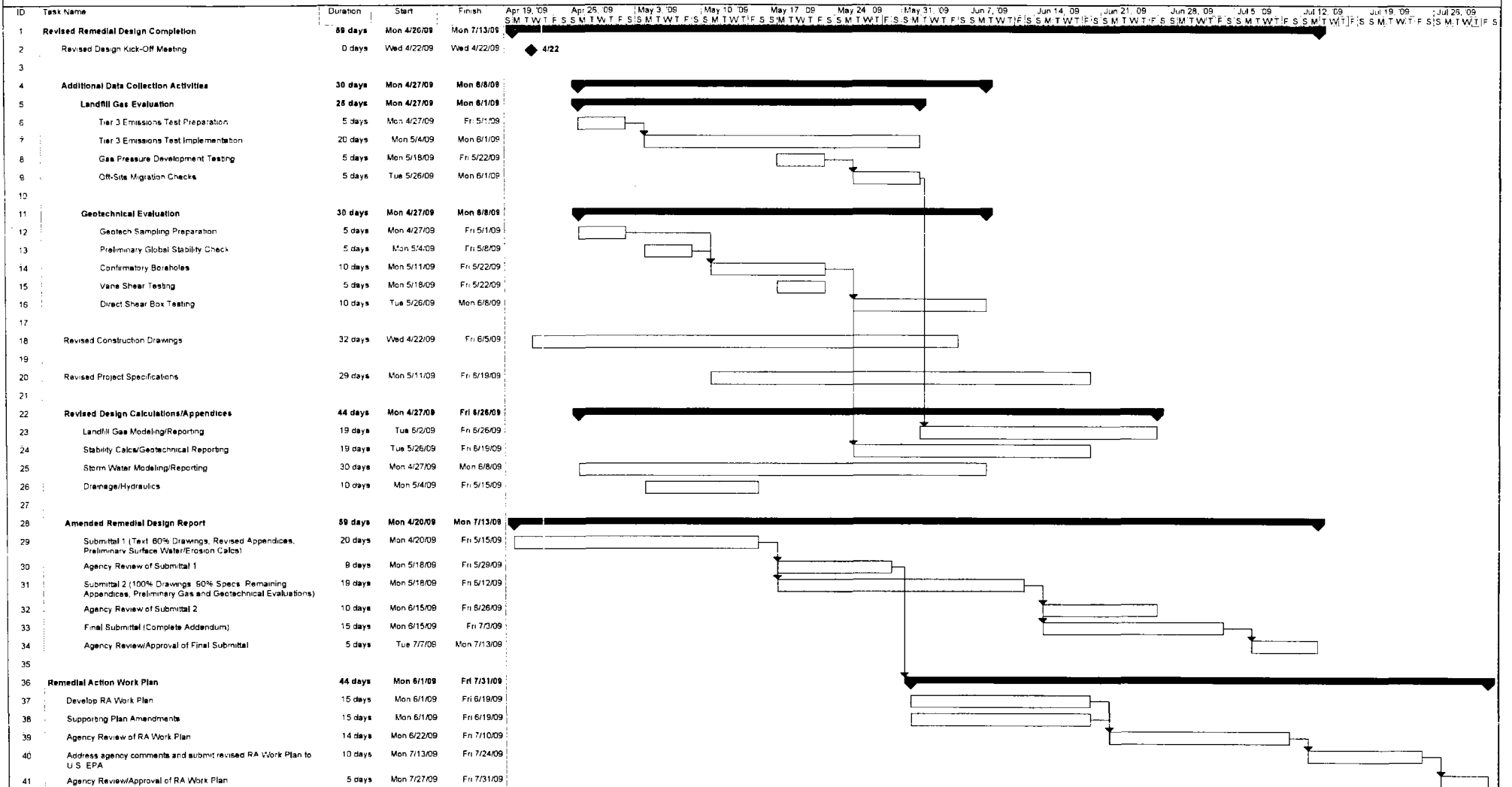


SECTION C
HORZ: 1"=100'
VERT: 1"=20'
fig. 1

figure 2
CROSS SECTIONS
3:1 GRADING ALTERNATIVE
12th STREET LANDFILL
Otsego Township, Michigan



**FIGURE 3
COMPLETION OF REMEDIAL DESIGN
12TH STREET LANDFILL
OTSEGO TOWNSHIP, MICHIGAN**





Project: Remedial Design
Date: Thu 4/23/09

Task: 
Split: 

Progress: 
Milestone: 

Summary: 
Project Summary: 

External Tasks: 
External Milestone: 

Deadline: 